

EVALUATION OF CONEWORM DAMAGE AT  
THE ERAMBERT, OUACHITA AND STUART ORCHARDS

by

N. A. Overgaard and H. N. Wallace

INTRODUCTION

For several years coneworms (*Dioryctria* spp.) have destroyed considerable quantities of seed at the Erambert, Ouachita and Stuart Federal Orchards in Mississippi, Arkansas and Louisiana respectively.

The value of these seeds has been estimated to be as high as \$591.00 per pound (Weir, 1974). The first generation crosses are expected to increase tree growth up to 15 percent, while the second generation crosses will increase growth up to 45 percent. Considering this value, the need to protect the seed can readily be understood.

Until recently, Guthion®, (azinphosmethyl), was registered for coneworm control on slash pine only; however, it has now been registered for use on loblolly, longleaf and shortleaf pines. Because many of the trees are beginning to bear cones, orchard personnel now desire to protect their cone crop from destruction by coneworms and other insects.

Currently, there is no technique available to adequately predict future trends of coneworm populations; consequently, the information in this report is based on damage surveys from January 1973 to April 1975.

METHODS

Coneworm damage was assessed by two different methods, one by counts of damaged second-year cones at harvest, and the other by tagging first-year flowers and making life table studies. Observations were made, and damage was recorded at monthly intervals from flower bud to seed maturation.

TECHNICAL INFORMATION

Insects - Southern pine coneworms, *Dioryctria amatella* (Hulst),  
*D. clarioralis* (Walker), *D. abietella* (Denis and Schiffermuller),  
*D. disclusa* Heinrich and *D. taedae* Schaber and Wood.

Hosts - Loblolly pine, *Pinus taeda* L., shortleaf pine, *P. echinata* Mill., slash pine, *P. elliottii* Engelm. var. *elliottii* and longleaf pine, *P. palustris* Mill.

Type of Damage - Larvae feed on and destroy first and second year cones, buds and shoots.

Life History - Depending on the species and geographical location, *Dioryctria* spp. have from one to six generations per year. Attacks are usually indicated by masses of resin and frass extruded to the surface of the food material. The interior of second-year cones may be completely hollowed out. Pupation of the southern pine coneworm occurs in host material. *D. abietella* must leave their host material to pupate. Overwintering occurs in the larval stage and sometimes the pupal stage (Goolsby et al. 1972).

## RESULTS

Coneworm damage to second-year cones for various pine species at the three orchards during 1973 and 1974 is summarized in Table 1. It should be realized that this figure derived at cone harvest underestimates total second-year cone loss during the year (DeBarr, 1974).

Absolute total flower and conelet loss due to coneworm attack is difficult to assess by monthly inspections since larval feeding often causes conelets to abort between examination periods. Nevertheless, some information has been obtained concerning flower loss by coneworms. An impact study on the Erambert Orchard in 1973 showed 6.9 percent conelet loss<sup>1/</sup> by *Dioryctria* spp. A similar study at the Ouachita Orchard, Mt. Ida, Arkansas, in 1974 showed 1.4 percent *Dioryctria* spp. damage to the flower crop (Overgaard et al. 1975). On the Ouachita Orchard, total flower loss was 87.5 percent with tip moth attack accounting for 46 percent of the total.

Losses of flowers, conelets and cones are summarized for the Stuart Orchard for the period January 1973 to April 1975 in Table 2. These data were collected by the Southern Forest Experiment Station until December 1974.

As an indication of potential losses which can occur to flowers from coneworm attack, an impact study conducted at bi-weekly intervals during 1973 at DeRidder, Louisiana, showed 47 percent of the total first year flower crop lost due to coneworm attack (Overgaard et al. 1974).

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<sup>1/</sup> Unpublished data collected by David C. Jones, Mississippi State University.

## DISCUSSION

Based on damage surveys conducted during previous years, it is likely coneworms will continue to cause appreciable damage from year to year; therefore, preventive control should be initiated by these Federal Orchards on all cone-producing geographical sources.

Monthly monitoring of insect damage is now being conducted at the Stuart and Ouachita Orchards to determine what insects are causing damage and when the damage is occurring. Such monitoring will continue at these orchards and be initiated at the Erambert Orchard, when spraying for coneworm control is started. Monitoring will help to determine the effectiveness of spray programs and help determine if adjustments in spray schedules are necessary to more closely make them coincide with insect activity.

## REFERENCES

- DeBarr, G. L. 1974. Harvest counts underestimate the impact of *Dioryctria* on second-year slash pine cone crops. USDA For. Ser. Res. Note SE-203, 3 pp.
- Goolsby, R. P., J. L. Ruehle and H. O. Yates, III. Insects and diseases of seed orchards in the south. Georgia Forest Research Council, Rpt. No. 28.
- Overgaard, N. A., L. E. Drake and H. N. Wallace. 1975. Ouachita Seed Orchard Impact Study Progress Report. Unpublished.
- \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_. 1974. Summary of Seed Orchard Insect Evaluations During 1973 by the Alexandria Field Office, USDA For. Ser., S&PF, Div. of Forest Pest Management. Rpt. No. 74-2-5.
- Weir, R. J. 1974. The Economic Impact of Seed and Cone Insects. Nineteenth Forest Insect Work Conference Proceedings. Arlington, Virginia.

Table 1. Percent losses, determined at harvest, to second-year cones due to coneworm infestation at Federal Orchards in Mississippi, Arkansas and Louisiana during 1973 and 1974

Orchard	<u>Loblolly</u>		<u>Shortleaf</u>		<u>Slash</u>		<u>Longleaf</u>	
	1973	1974	1973	1974	1973	1974	1973	1974
Erambert	14	12	--	--	6	4	27	24
Ouachita	--	--	40	1	--	--	--	--
Stuart	10	27*	18	9	2	26*	25*	14

\* From data collected by B. F. McLemore, Southern Forest Experiment Station, Pineville, Louisiana.

Table 2. Percent losses caused by insects at Stuart Orchard

Pine Species	1973*		1974		1975 (Feb-Apr)
	Total <sup>1/</sup> losses	Insect Losses	Total <sup>1/</sup> losses	Insect losses	Total <sup>2/</sup> losses
Shortleaf	83.3	45.8	73	30	42
Loblolly	64.3	38.3	--	--	20
Longleaf	99.9	64.0	42	32	64
Slash	58.8	28.7	--	--	34

\* Unpublished data collected by B. F. McLemore, Southern Forest Experiment Station, Pineville, Louisiana.

<sup>1/</sup> Flowers, conelets and cones.

<sup>2/</sup> All insect caused (flowers and conelets).